Historic, archived document

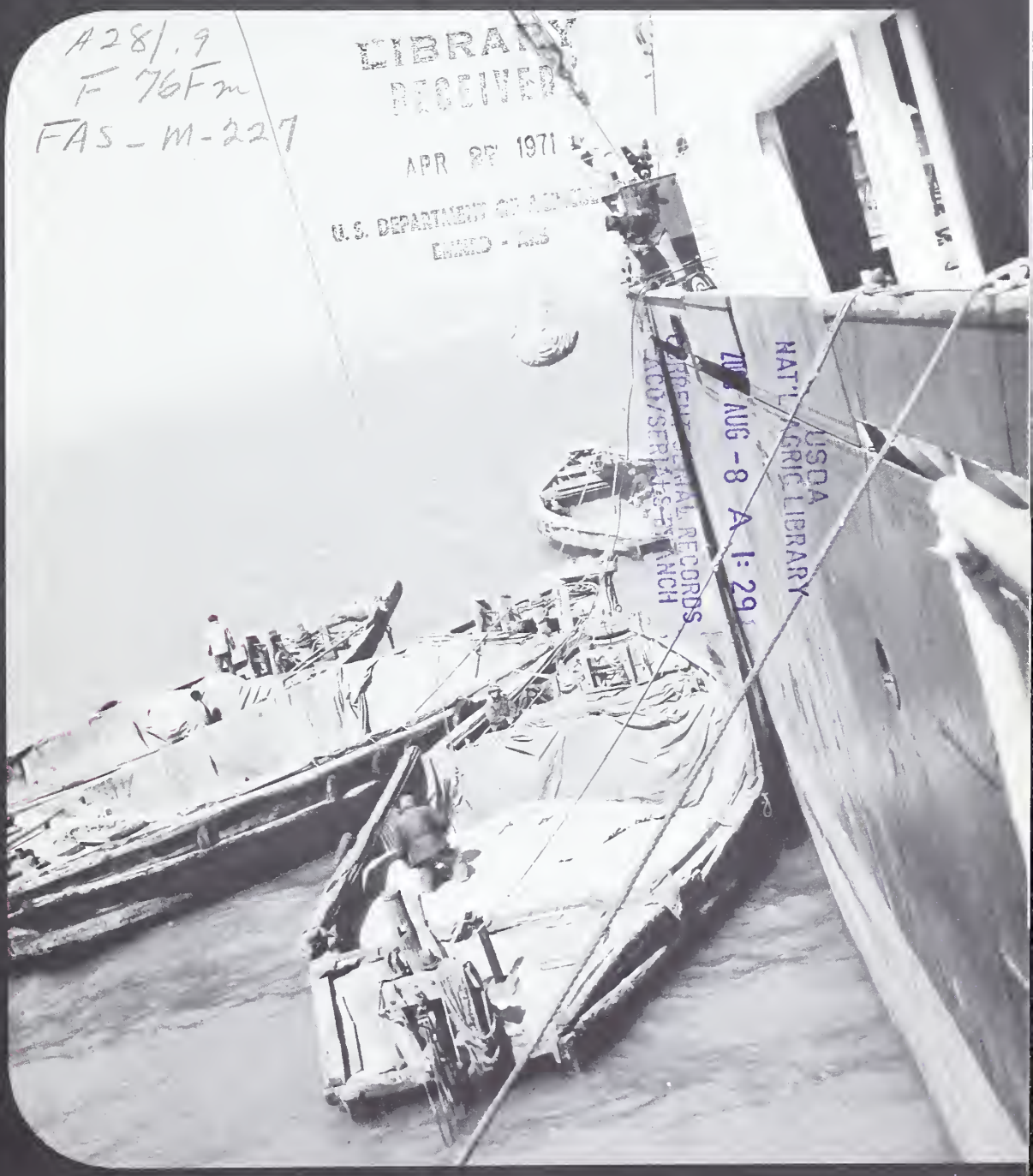
Do not assume content reflects current scientific knowledge, policies, or practices.

FAS-M 227

FEBRUARY 1971

A281.9
F76Fm

Markets for U.S. Soybeans and Soybean Products in ASIA and OCEANIA



A281.9
F 76Fm
FAS-M-227

LIBRARY
RECEIVED
APR 8 1971
U.S. DEPARTMENT OF AGRICULTURE

USDA
NAT'L AGRIC LIBRARY
1971 AUG -8 A 1: 29
RECORDS
BRANCH

FOREIGN AGRICULTURAL SERVICE • U.S.DEPARTMENT of AGRICULTURE

VF - SOYBEAN

FOREWORD

The market for U.S. soybeans in some of the developing countries of Asia has changed considerably in the last few years. Soybean foods have long been a primary source of protein in the diets of millions of people in this area, and the United States has been able to share somewhat in the market for food soybeans. However, this market has been a highly competitive one. A few countries have produced their own soybeans. Where imports have been required, Mainland China has made heavy inroads into the market, and other traditional exporters have been supplying soybeans to the area.

Today, new markets for soybeans are appearing, not only in developing Asia, but also in Australia and New Zealand. These new markets require beans high in oil content for crushing into soybean oil for consumer use and, particularly, soybean meal for use by the commercial hog and poultry industries that are expanding with the adoption of modern breeds and mixed feeds. U.S. soybeans, which have been developed specifically for crushing into oil and meal, are being used increasingly in the new crushing mills that have been built in this part of the world to meet demands for these products. U.S. soybean meal, too, is finding sizable new markets in those countries that do not have sufficient domestic production of this product to meet the needs of the growing mixed feed industries.

This publication covers the changes that have taken place in the Asian and Oceanic markets for soybeans and soybean products over the last decade, as well as the developments that precipitated those changes. It supersedes and updates *Southeast Asia as a Market for U.S. Soybeans and Vegetable Oils,* FAS M–126, February 1962.

The author appreciates the cooperation and assistance of the many importers, dealers, crushers, feed mixers, scientists, and government officials throughout the area covered herein, who supplied him with invaluable information. He also wishes to thank the U.S. Agricultural Attachés and their staffs and officials of the U.S. Agency for International Development in the area.

Howard A. Akers, Acting Director
Fats and Oils Division

CONTENTS

Page

Introduction 1

Hong Kong 3

The market for soybeans and products 3
Marketing problems 4

Indonesia 5

Production of oil-bearing materials 6
Prospects 6

Korea (South) 6

Domestic oilseed production 7
The oilseed crushing industry 8
Use of soybeans for food 8
Use of soybeans for feed 9

The Philippines 13

Domestic soybean production 13
The crushing industry 16
Poultry and mixed feed industries 16

Singapore and Malaysia 17

Soybean crushing 17
Shipping 18
Feed production and use 18

Australia 20

Domestic soybean production 21
Production of other oilseeds 22
Oilseed crushing industry 22
Mixed feed and poultry industries 23
Margarine 24

New Zealand 25

Domestic oilseed production 26
Feed situation and imports 26

Markets for U.S. Soybeans and Soybean Products in Asia and Oceania

By Calvin C. Spilsbury
Fats and Oils Division

INTRODUCTION

During the last two decades a number of developing countries in Asia became markets for U.S. soybeans for use in traditional Chinese- and Japanese-type soybean foods. The demand for soybeans for food uses still exists in these countries, of course, but much of the market for these beans is being supplied by domestic production, as in South Korea, and by beans from other exporters, such as Mainland China. Today, these countries, plus Australia and New Zealand, are present and potential markets for increasing quantities of U.S. soybeans for crushing into meal, or for meal as such. U.S. soybean oil has met stiff competition and controls in this area—because of the availability of large quantities of palm, coconut, and other oils—but some still moves there under dollar sales.

The new demand for crushing soybeans and for soybean meal stems for the most part from the spectacular increases in production and consumption of poultry meat now occurring throughout the area. Also important are the expanding egg and pork industries. Having discovered the production efficiencies that come with the use of modern mixed feeds containing soybean meal, these industries are demanding larger quantities of these feeds. Mixed feed industries have been springing up to meet these demands. The developing poultry and livestock industries are also using new animal breeds imported from the United States and other countries.

Exports of U.S. soybeans and soybean products to the countries covered herein—Hong Kong, Indonesia, South Korea, the Philippines, Singapore, Malaysia, Australia, and New Zealand—today are equivalent to about 100,000 tons of soybeans. An estimated 300,000 tons are needed and will likely be imported in the next few years, primarily to supply meal for the rations required by expanding poultry industries. South Korea can be expected to take 80,000 to 100,000 tons of beans for crushing in new mills and for food, compared with less than 20,000 tons today. The Philippines could take 60,000 to 80,000 tons as meal or bean equivalent, compared with 49,330 tons in 1969. Singapore's new crushing mills may take around 60,000 tons of soybeans, compared with only small quantities sold there for edible use in the past. Australia could take 50,000 tons of meal or beans, compared with 1969's 27,000; and New Zealand could possibly import 10,000 tons. Malaysia took small shipments for crushing in 1970.

Indonesia and South Korea are large producers of soybeans, but these crops, at 440,000 and 250,000 tons, respectively, are all used for making soybean foods. Other countries, particularly the Philippines, Australia, and New Zealand, are directing special efforts toward increasing domestic soybean production, but progress with this and other oilseed crops such as safflowerseed, sunflowerseed, and rapeseed has not been rapid. As a result, these markets for U.S. soybeans and soybean products—particularly meal now and beans later—are expected to grow significantly with expansion of the demand for soybean meal in poultry and hog feeds. This development is expected to come more slowly in Indonesia than in the other countries because scientific feeding of poultry and livestock has not yet begun there.

Favorable economic growth of several U.S. trading partners in the Far East has resulted in record sales of soybeans, particularly in Japan and the Republic of China (Taiwan), which purchased 106 million and 20 million bushels, respectively, in the 1969-70 marketing year. This growth is expected to continue, and added to the new markets that are springing up, should ensure a healthy future for U.S. soybeans in the area.

Competition in the Asian markets is keen for food-grade soybeans because traditional suppliers—like Mainland China, Thailand, South Africa, and countries in eastern Africa—have been able to hold onto their markets despite the fact that the U.S. soybeans in the lower price brackets have been found to be equally adaptable for processing into

U.S. exports of soybeans, soybean oil[1], and soybean meal to selected countries in Asia and Oceania

Country and Items	Unit	Average 1955-59	Average 1960-64	1965	1966	1967	1968	1969
Australia:								
Soybeans	*Bushels*	–	2,223	28,340	19,129	4,054	–	4,662
Soybean oil	*1,000 lb.*	9	4,171	9,800	4,742	7,889	4,674	3,610
Soybean meal	*Short tons*	8	7,743	23,866	27,018	37,671	26,391	27,016
Hong Kong:								
Soybeans	*Bushels*	75,925	195,854	11,200	12,638	33,578	67,471	91,322
Soybean oil	*1,000 lb.*	193	32,382	18,805	2,098	7,599	9,676	2,317
Soybean meal	*Short tons*	–	297	446	516	1,700	2,849	1,774
Philippines:								
Soybeans	*Bushels*	65,375	181,660	948,932	774,969	11,337	–	–
Soybean oil	*1,000 lb.*	45	352	6,695	2,911	10,325	2,236	86
Soybean meal	*Short tons*	7,203	11,086	5,697	9,211	38,164	42,791	49,330
Singapore-Malaysia:								
Soybeans	*Bushels*	747	373	–	–	2,574	2,313	215,733
Soybean oil	*1,000 lb.*	1	--	965	1,043	1,076	287	–
Soybean meal	*Short tons*	43	669	325	1,410	324	–	4,616
South Korea:								
Soybeans	*Bushels*	1,306,655	663,095	–	–	800,974	1,271,434	2,020
Soybean oil	*1,000 lb.*	372	33	–	1,092	1,439	1,475	3,378
Soybean meal	*Short tons*	32	–	–	–	–	2,712	3,111
Okinawa (Ryukyu Islands):								
Soybeans	*Bushels*	36,886	420,773	480,988	332,426	136,122	–	–
Soybean oil	*1,000 lb.*	–	849	2,809	694	7,962	1,740	2,825
Soybean meal	*Short tons*	–	–	56	–	–	2,240	–
Burma:								
Soybean oil	*1,000 lb.*	20	13,043	–	100,929	4,534	–	–
Indonesia:								
Soybean oil	*1,000 lb.*	–	154	2,110	119	99	711	–
South Vietnam:								
Soybean oil	*1,000 lb.*	–	3,616	3,255	26,716	32,145	34,602	38,774
Soybean meal	*Short tons*	–	–	–	24	330	–	–
Other:[2]								
Soybean oil	*1,000 lb.*	62	3	3,069	544	658	618	176

[1] Including soybean oil donations 1965-69.

[2] Pacific Trust Territories, New Zealand, Thailand, Cambodia, Laos, British Western Pacific Islands and others.

soybean foods like curd and sauce. With the development of the new feed demand for soybean meal, the United States has competition from only a few crushing countries like Brazil, the Netherlands, and Israel, which have been shipping soybean meal to this area. And as countries in the area—including Singapore, the Philippines, South Korea, and potentially Australia—establish their own modern continuous solvent-extraction facilities, the market for U.S. soybeans could become firmly established if quality beans are supplied. Access problems for soybeans in the Philippines are still to be solved, but this country can be expected to remain a market for U.S. meal.

U.S. soybeans continue to face criticism on low quality for food use, and complaints on high foreign-material content have been received on the crushing soybeans shipped to several new users in 1970. There is a particular need to develop improved marketing methods—containerization may be a possibility—to supply quality food soybeans low in foreign materials and with high germination rates for sprouted beans. Use of U.S. soybeans is still limited largely to those foods in which split and broken beans can be used because many of the better-quality U.S. beans (identity [variety] preserved) have been quoted at prices above those of other countries, particularly in Hong Kong and Singapore. Better control of foreign material and other factors desired in soybeans shipped abroad for both food and crushing are currently being developed by the U.S. Government and industry.

Imports of U.S. soybean oil into the Asian countries under discussion have shown considerable variation in recent years. In the market for blending with peanut oil, competition comes from Mainland Chinese rapeseed oil, which often replaces U.S. soybean oil. Import controls may shortly start to influence the U.S. market in Australia for both soybean and safflowerseed oils. Coconut oil (a highly saturated oil) is still being used extensively in the liquid oil and blending markets of Asia despite present trends in other countries away from use of such oils for this purpose. With the growing demand for meal in this area, adequate supplies of oil will likely become available from countries crushing U.S. soybeans, and a further decline in oil imports from the United States is possible. Hong Kong's imports of soybean oil from the United States averaged 32 million pounds in the period 1960-64, but have fallen considerably since then. U.S. soybean oil could find new outlets in Asia. For example, nearly 40 million pounds were shipped to South Vietnam in 1969 under U.S. Government-financed procurement.

HONG KONG

The British Crown Colony of Hong Kong has a population of around 4 million with a per capita income that is now around $620 and is growing rapidly. Hong Kong continues to be a market for U.S. soybeans for food uses and for U.S. soybean and peanut oils, but its imports of U.S. soybeans and soybean products have been very irregular, and at times only nominal, owing to competitive conditions in this highly price-conscious market. U.S. soybean oil found favor here in the early 1960's, but the present market is slow. Hong Kong's economic upsurge has not brought an increase in demand for U.S. oilseeds or vegetable oils.

Nonetheless, the market promises to widen in the future. Although Mainland Chinese soybeans, peanuts, and vegetable oils—mainly rapeseed oil—are very competitive in this market, indications are that shortages and increased consumption within Mainland China could again open up the Hong Kong market for U.S. soybean oil. Japanese and Taiwanese soybean oils, crushed from U.S. soybeans, sell well at times in the Hong Kong market, particularly when vegetable oil supplies from Mainland China are at a low level.

In addition to vegetable oils from other suppliers, a major competitive factor in the Hong Kong market is a strong consumer preference for peanut oil with a heavy peanut odor. The expanding market for this oil is being met with supplies from South Africa, other areas of Africa, and East Asia. Some U.S. peanut oil has moved to this market in recent years. Customers reportedly have paid as high as US$66.70 for 133 pounds of prime quality peanut oil with a very good peanut odor. U.S. soybean oil has been blended (estimated 25-50 percent) with peanut oil for the consumer market. The United States supplied 9,676,000 pounds of soybean oil in 1968, 60 percent of the market; but in 1969 the market for blending oils was taken over by Mainland Chinese rapeseed oil because of its low price. U.S. shipments of soybean oil fell drastically in 1969 but in 1970 exports of U.S. soybean oil again rose and the marketing year (October 1, 1969-September 30, 1970) total was 12,199,000 pounds.

Demand for soybean meal is expanding rapidly as Hong Kong's poultry production increases. Per capita consumption of poultry is high (24.3 pounds in 1967), and about half the poultry consumed is produced locally.

The market for soybeans and products

About 85 percent of Hong Kong's soybean imports now come from Mainland China. U.S. soybeans have had only a small share of the Hong Kong food market since 1958-61, when Mainland Chinese soybeans were out of this market. The United States shipped a recent high of 91,322 bushels there in 1969. Other important suppliers are eastern Africa, South Africa, and Thailand. The main reasons why Mainland China can hold on to this market are price and prompt service. Mainland China's soybeans are nearly always priced lower at the retail level in Hong Kong for a given quality than are U.S. soybeans.

The U.S. soybeans shipped into this market have been of excellent quality, according to a leading Hong Kong dealer whose company imported 1,000 tons of U.S. soybean oil and most of the U.S. soybeans sold in this market in 1969. U.S. soybeans are now being used along with soybeans from Mainland China in the production of soybean milk, according to reports of the Hong Kong Soya Bean Products Company.

Hong Kong's requirements for soybean meal average well over 200 tons a month. In recent years, owing to some freight advantages, the Crown Colony has imported most of this soybean meal from Brazil. However, some meal has continued to be brought in from the United States. The Brazilian meal is of the solvent-extraction type, the same as that obtained from the United States. However, users report that the quality is not so high. Imports usually

HONG KONG: Imports of soybeans

Country of origin	Average 1960-64	1965	1966	1967	1968	1969 (Jan.-Aug.)
Quantity:	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*
Mainland China	527,205	73,048	438,138	561,674	601,206	398,016
United States	161,172	15,377	12,035	60,155	68,496	39,108
Thailand	9,144	5,401	8,378	36,575	6,691	17,158
Cambodia	26,929	23,668	–	–	–	–
East Africa (Kenya - Tanzania)	3,970	–	2,315	22,699	7,916	–
Indonesia	1,837	–	279,372	102,500	1,107	–
Japan	2,019	–	–	38,434	–	–
South Africa	760	–	–	12,683	–	7,349
Taiwan	11,237	–	–	–	–	–
Other[1]	2,651	2,662	6,938	19,320	2,657	1,835
Total	746,921	120,156	747,176	809,040	688,073	463,466
Value:	*U.S. dol*[2]	*U.S. dol*[2]	*U.S. dol*[2]	*U.S. dol*[2]	*U.S. dol*[2]	*U.S. dol*[2]
Total	2,057,628	357,514	2,036,626	2,541,442	2,201,937	1,500,256
U.S. shipments	450,764	50,666	37,535	222,985	229,193	144,114

[1] South Korea, Macao, Singapore, Laos, Mozambique, Nigeria. [2] HK $5.75 - 6.00 = US$1.

Source: Hong Kong Trade Statistics, Department of Commerce and Industry.

HONG KONG: Imports of soybean oil

Country of origin	Average 1960-64	1965	1966	1967	1968	1969 (Jan.-Aug.)
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
United States	30,148,787	20,959,792	3,136	2,894,080	10,170,384	3,411,520
Japan	18,389,235	7,412,384	2,783,424	5,914,720	5,492,592	–
China (Mainland)	20,586	–	–	101,136	–	–
Germany	3,315	4,368	–	–	–	–
Netharlands	370,765	44,800	–	44,464	88,256	44,128
United Kingdom	35,370	106,288	21,280	–	8,512	7,168
Taiwan	132,899	2,894,416	1,239,168	594,384	–	–
Other	65,878	–	–	[1] 112,560	–	–
Total	49,166,835	31,422,048	4,047,008	9,661,344	15,759,744	3,462,816

[1] Malaysia.

Source: Hong Kong Trade Statistics, Department of Commerce and Industry.

are made in small lots of 50 to 100 tons. Some of this meal has been re-exported to Malaysia, where soybean meal is used in combination with corn from Thailand for feeding to poultry and ducks. However, Hong Kong's position as a re-exporter of soybeans and soybean oil and meal has declined in recent years, and the quantity now moving out of the port is becoming minimal. A new crushing mill in Singapore is expected to supply at least part of the Malaysian demand for soybean meal.

Brazil's advantage in shipping soybean meal to Hong Kong is based on the fact that the soybean meal can be carried at more economical rates aboard the same cargo ships that carry cotton. Also, Brazil ships pelleted soybean meal, which is now being sold in Hong Kong in bulk.

Marketing problems

Storage or go-down space is a real problem in Hong Kong. Fortunately, the one large dealer in U.S. soybeans, soybean oil, and peanut oil does have sufficient handling and storage facilities to maintain a profitable operation. The storage problem puts commodities shipped in small lots in an advantageous position.

From time to time, manufacturers of Chinese soybean foods in the Crown Colony have reported that soybeans from Mainland China have more protein than U.S. beans. This, they say, increased the demand for Chinese beans for food uses despite the fact that U.S. soybeans have more oil.

Mainland China's marketing practices for soybeans and vegetable oils (peanut and rapeseed) in Hong Kong have changed in recent years. This country is doing away with its former practice of shipping unconsigned cargoes, a practice which resulted in heavy losses because of price declines in the market caused by large, ill-timed shipments. The Chinese are now making calls on all their customers prior to shipment and are requesting forward commitments on needs for coming months. They then ship soybeans and vegetable oils to Hong Kong on consignment. Thus, sudden changes in the market—with high losses to merchants holding stocks—are being prevented. As a result, soybean prices have tended to stabilize in recent years.

INDONESIA

Indonesia, with an average per capita income of $85, does not appear to offer potential as a cash market for U.S. soybeans or soybean products for feed use in the near future, primarily because it lacks a modern livestock and poultry industry and a mixed feed industry. Because domestically produced soybeans, around 440,000 tons annually, are all used for human food, the crushing industry does not process soybeans for edible oil and meal for livestock feed. The most common soybean foods are Tempeh, a fermented soybean mash cake, and soybean curd, coagulated soybean milk. Every city and village has many small factories producing soybean foods.

In Java, which has around 70 million people, pressure is put on the land for food production, mainly grain and rice, which leaves little land for growing feed crops. No scientific feeding of livestock is being done in Indonesia, as no grain and very little protein are available for feeding. There are only about 10 poultry farms with about 500 birds each. Eggs are high priced and not in great demand; also, 90 percent of the eggs used are duck eggs.

Consumption of fats and oils has been estimated at from 8 to 17 pounds per person. No doubt consumption on Java is closer to the former figure, as production is mainly in the outer islands. A large potential market for vegetable oil exists in Java. Indonesia's low purchasing power limits production and consumption of liquid edible oils and margarine, as well as other sophisticated fats and oils products, but this market is widening slowly. Coconut and palm oils serve as the basic edible oils. However, soybean oil could be used as an edible oil in Indonesia. Reports indicate that the landed price in Java of refined soybean oil from the United States would be 59 rupiahs per kilo (14.7 U.S. cents per pound), against 51 rupiahs per kilo (12.7 cents per pound), for local refined coconut oil. Thus, while coconut oil would have a price preference over soybean oil for liquid oil use, soybean oil could become available for edible use as an unsaturated liquid oil for blending or for other uses as hydrogenated oil.

The fats and oils industry in Indonesia is expecting production of palm oil to increase and that of copra to decline over the long run. This outlook is based on the failure of the large number of small holdings producing copra to replant and the lack of incentive to control insects and diseases. On the other hand, many new oil palm areas are being developed.

Commercial production of coconuts and copra is located mainly in the northern tip of the Celebes and along the coasts. Copra production was around 1,310,000 metric tons in 1969. Oil palm production is practically all on the Sumatra estates on the coast of the Strait of Malacca. Palm oil production was 150,000 tons in 1969.

Both domestic palm and coconut oils are utilized in Indonesia's limited production of soap. A milled toilet soap is produced from 70 percent palm oil and 30 percent coconut oil. Also a household soap is made from 60 percent palm, 30 percent coconut, and 10 percent other oils and fats.

A modern oil mill for crushing copra and a modern (Italian continuous) soap and margarine plant are located in Djakarta. The coconut oil mill has three (super duo) screw presses and other presses and can handle over 175 tons of copra (120 tons of oil) per day. The soap and margarine plant produces a water-phase margarine with about 2½ percent salt, as well as 65 tons of toilet soap per day and 100 tons of laundry soap per week.

There is a batch-type refinery to handle various types of vegetable oils. Also, a new detergent plant is under construction.

Indonesia's first prepress solvent-extraction plant for crushing copra was opened in the spring of 1970 at Makassar. Capacity is 2,000 tons of copra per month. A second plant of this type is under construction at Bitung. As soybean production expands in Indonesia, the new plants could possibly be used for processing some local soybeans.

Production of oil-bearing materials

The important changes in agricultural production in recent years in Indonesia have been centered around oilseeds. Production of soybeans is reported to have increased by one-third in 1969, although the actual increase is believed to have been lower. As mentioned earlier, no soybeans are crushed for oil in Indonesia despite the large crop. Peanut production increased at a slightly higher rate of 35 percent. However, palm oil production is reported to have continued to decline despite hopes of the fats and oils industry that this trend would reverse; a 9-percent drop was registered in 1969. Since both peanuts and soybeans are used largely on farms and commercial marketings are nominal, actual changes in production are difficult to assess.

INDONESIA: Area and Production of Oil-Bearing Materials

Item	Area				Production				Change, 1969 over 1968
	1966	1967	1968	1969	1966	1967	1968	1969[1]	
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 metric tons*	*1,000 metric tons*	*1,000 metric tons*	*1,000 metric tons*	*Percent*
Soybeans	[2] 1,633	[2] 1,531	([3])	([3])	[2] 375	[2] 363	[2] 333	442	+ 32.7
Peanuts (shelled)	[2] 1,000	[2] 961	988	([3])	263	[2] 242	[2] 251	340	+ 35.4
Palm oil[4]	272	269	([3])	([3])	159	174	[2] 188	172	- 8.5
Palm kernels	---	---	---	([3])	---	---	---	42	---
Copra	([3])	([3])	([3])	([3])	([3])	1,248	1,275	1,300	+ 2.0

[1] Preliminary. [2] Revised. [3] Not available. [4] Acreage in oil palm, production of palm oil.

Prospects

No indicators at the present time point to the development of industries using soybean meal—modern poultry and hog raising, as well as back-up feed mixing industries—in Indonesia. As a result, industrial demand for soybeans and soybean meal is unlikely to develop in the near future.

Development of a modern broiler industry would certainly help to alleviate the present shortage of protein foods. Currently, the poultry industry is small and in need of intensive development.

The domestic soybean crop is likely to continue to expand in coming years to meet the growing demand and need for soybeans as food.

KOREA (SOUTH)

South Korea, with a population of over 32 million and a gross national product that is growing 11-15 percent annually, is a potential market for 100,000 metric tons or more of U.S. soybeans and/or soybean meal despite an annual domestic production of over 225,000 tons of soybeans. The major factor that is expected to bring about an increase over the 15,000 to 20,000 tons of soybeans imported annually from the United States in recent years is completion of a modern continuous-solvent extraction facility capable of crushing 200 tons per day. A government/crusher agreement has been worked out to import around 60,000 tons of soybeans annually for crushing for oil and meal. Also the rising demand for soybean meal for the poultry industry points to a need for more soybean meal, and from 80,000 to 100,000 tons (bean equivalent) may be called for by 1975.

Most oilseed crushing mills in South Korea are working at a rate of 25 to 30 percent of capacity owing to a shortage of oil-bearing materials. The industry is capable of handling around 300,000 tons of oilseeds, but import controls prevent imports of sufficient soybeans or other oilseeds to effect the utilization of this capacity. (Licenses have been required for soybean imports; recommendations have come from the Food Bureau of the Ministry of Agriculture and Forestry, and the licenses have been issued by the Ministry of Commerce and Industry. A 25-percent

import tax has restricted the use of soybeans for crushing. Meal is exempt from the tariff but is under quota. Soybean oil also is under quota.) Additional modernization of crushing mills should come about after the industry leaders now backing it have worked out further import agreements for oilseeds. They are particularly interested in crushing U.S. soybeans.

Increases in vegetable oil marketings point to a possible jump in the demand for vegetable oil for household and institutional uses. The demand for vegetable oil traditionally has been minimal because rice and other boiled foods have been consumed much as they were in Japan in the early postwar years. Korea's visible fats and oils consumption is only around 3 pounds per person annually, compared with over 50 pounds (53 pounds 1969-70) in the United States. However, the rise in per capita gross national product from $144 in 1965 to $212 in 1969 has brought an increase in consumption of Western-type foods, particularly fried chicken and other foods utilizing vegetable oils. This trend points to an increase in demand for liquid vegetable oils such as occurred in Japan following World War II.

Despite tighter government controls on import credits during 1969, it is believed that increased imports of U.S. soybeans and/or soybean meal will be allowed in coming years. Exports of U.S. soybeans and soybean meal to S. Korea jumped significantly in marketing year 1969. For soybeans for the marketing year beginning September 1, 1969 through August 31, 1970, exports totaled 1,338,000 bushels compared with 632,000 bushels the prior year and for soybean meal for marketing year October 1969-70 exports totaled 20,120 tons many times the 3,923 tons imported the prior marketing year. Soybean meal has become a highly desired ingredient in mixed feeds in the last 2 or 3 years, mainly as a result of the development of a modern poultry (broiler and layer) industry and the simultaneous expansion of the mixed feed industry. While corn is still the most important ingredient imported for mixed feeds, soybean meal is fast becoming essential as it provides the necessary amino acids for the most economical feed conversion; these are lacking in many of the local meals, which are primarily rapeseed and cottonseed. Fishmeal is also being used more in conjunction with soybean meal.

Private investment from abroad and U.S. Commodity Credit Corporation loans made under the Foreign Capital Inducement Law (1962) and U.S. Specific Risk Investment Guaranty Status have made a substantial contribution to the development of the poultry industry and the growing demand for soybean meal. Of particular significance have been CCC loans on corn to four U.S./Korean firms totaling several million dollars.

It has been estimated by several feed mixers that the demand for chicken meat in Korea will expand at a rate that will double or triple broiler production above 1969 levels by 1973. Further expansion of the market for soybean meal is expected to follow.

Domestic oilseed production

Production of soybeans in Korea rose from 129,930 metric tons in 1960 to an estimated 245,000 tons in 1968 and 229,000 in 1969. Continued expansion was programmed for 1970, when 243,233 tons were reported to have been produced. Over 300,000 tons are currently needed for direct food use. Thus, only small amounts of domestic beans, as previously pointed out, are available for crushing into oil and meal. A study covering the period November 1966 to October 1967 showed the following commercial use of soybeans:[1]

	Metric tons
Soybean curd (tofu)	46,048
Soybean sprouts	13,663
Soybean oil	4,280
Soybean sauce (shoyu)	2,979
Soybean confectionary use	965
Other	7
Total	67,942

It has been estimated that the total domestic soybean crop during 1968 was used as follows:[1]

	Metric tons
Home food use[2]	130,000
Commercial processing	78,000
Seed	22,000
Feed and loss	15,000
Total	245,000

[1] Food Administration Section, Ministry of Agriculture and Forestry.

[2] Used as follows: 40 percent sprouts and curd; 30 percent soybean paste and sauce; 20 percent soybeans for food, cooked; 10 percent other uses.

There is a shortage of oil-bearing material for crushing in South Korea, and the government has been unsuccessful in establishing self-sufficiency in vegetable oils. The average rate of operations of fats and oils plants is around 30 percent owing to this shortage of materials. However, the Korean Government is trying to step-up this rate to at least 50 percent. Rapeseed is the major domestically produced oilseed crushed; it accounts for about 60 percent of the total. Another 20 percent consists of cottonseed, soybeans, pepperseed, and sesameseed. Rice bran makes up another 20 percent.

The oilseed crushing industry

The oilseed crushing industry in South Korea is composed of 96 mills, most of which have a capacity of less than 50 tons per day. The total capacity in terms of crude oil produced is approximately 90,000 to 100,000 tons annually, although the industry operates at only a fraction of capacity. In terms of rapeseed, the capacity is 270,000 to 300,000 tons. The industry processes approximately 60,000 to 90,000 tons of material each year, including 20,000 tons of rapeseed; 5,000 tons each of sesame, cottonseed, and perillaseed; and 5,000 tons of other oilseeds, including flaxseed, castor, pepperseed, and sunflowerseed; and large quantities of rice bran. Some 4,000 to 5,000 tons of domestic and imported soybeans also are crushed. The industry produces some 20,000 tons of rapeseed and other edible oils (including rice bran oil) annually from domestically produced oil-bearing materials; the balance of the oil produced is from imported materials.

There are 35 batch solvent extraction mills, 57 screw-press mills, and four old hydraulic mills operating. All of the batch solvent mills prepress the oilseeds. About 25 of the solvent mills have capacities of between 30 and 50 tons a day, and the capacities of the remaining ones are lower.

Sixty of the mills also have small refineries, and 15 have some continuous refining equipment. Normal hexane is imported from Japan, but domestic production has begun in recent years.

A new modern continuous solvent-extraction mill that will process 200 tons of soybeans a day or around 60,000 tons per year is being built at Maison near Pusan and is expected to begin operating in February 1971. Storage capacity is 18,000 tons. This mill will be the first in Korea built to crush soybeans exclusively. The soybeans for the new crushing plant are expected to come from the United States. The plant was originally scheduled to open in November 1969, but the opening was delayed because of the loss of the original Israeli machinery at sea.

The soybean oil produced at this plant will be used to meet the increase in demand for edible vegetable oil, margarine, and shortening. Some of the meal is expected to be used for soy sauce, soybean curd, and possibly soy paste.

Each year the plant will produce 6,200 metric tons of liquid edible soybean oil, 3,000 tons of margarine, 600 tons of shortening, about 7,000 tons of soybean flour, 37,000 tons of soybean meal for processing for human consumption and livestock feed, and 5,300 tons of hulls and animal feed. The company has planned to commence crushing with two shipments of U.S. soybeans to be delivered in January and May 1971.

Soybeans destined for South Korea are usually shipped from U.S. Gulf ports. They are higher in cost than those landing in Japan because of higher freight rates and greater discharge costs in Korea.

Bulk ocean freight rates to South Korea from U.S. Gulf ports in early 1970 were running as high as $17.50 per metric tons for cargo lots. The rate was around $16.00 per ton in late 1970. These rates were around $10.00 to $13.00 per ton during 1969, somewhat lower than in early 1970.

All soybeans discharged in Korea are received in bulk grain carriers and are loaded out in slings to barges, from which they are taken to port and bagged before being loaded on trucks. This is a costly and time-consuming operation for both discharging and delivery. Modern bulk facilities at the new mill will reduce these costs somewhat. Labor costs in Korea run about $1.50 per day.

Use of soybeans for food

One of the major marketing problems regarding domestic soybeans in Korea is to maintain enough soybeans on farms to provide sufficient quantities for home consumption. Soybeans are a cash crop and as such move rapidly from farms. While about 60 percent of the beans were formerly marketed commercially and 40 percent consumed on the farm, this percentage has changed with the increase in the size of the crop until now only about 25 to 30 percent of the beans are consumed on the farms, while 70 to 75 percent are marketed in local villages or in commercial channels.

Soybeans are an important part of the total food supply in Korea. As in Indonesia, they have never been used extensively for crushing. Soybean oil has been imported from the United States, but it generally has been brought in under government programs.

Soybean curd (tofu in Japan) is the protein gel made by coagulating the soybean milk expressed from cooked soybeans with calcium or magnesium salts. A large percentage of the soybeans marketed in the villages is made into soybean curd in the homes. Curd is also made in hundreds of small factories; Seoul alone has over a hundred such factories. This protein food is used in Korean homes almost daily as a soup ingredient or is fried (in fat) and used as a protein dish in place of meat. It is also mixed with soy sauce, fish, and seasonings to produce a special dish.

Soybean sprouts are used extensively as a food in South Korea. They are produced and sold commercially during the winter months, when they are much in demand. Sprouts are often sold by peddlers on the streets.

Soybean sauce is used as a condiment and is a popular and nutritious product. It is now made extensively with soybean meal rather than soybeans in other countries of Asia, and this method is being adopted in South Korea. All Koreans have soy sauce on their tables. Soy sauce is made in many small commercial factories as well as in the home.

Seasoned soybeans are made by boiling soybeans in sweetened soybean sauce. This is a popular dish in South Korea.

Soybean paste (kochojang or kochuchang), a bean mash used to make soup, is made in Korean homes in conjunction with the production of soybean sauce; much of it is highly seasoned with pepper. Soybeans are boiled and mashed and hung up in sacks to cure for 2 or 3 months. The cured soybeans are then dried and ground. Ground red peppers, salt, and water are added, and the mixture then is stored for several months in crocks. It is then boiled with ground meat and other ingredients, such as sugar.

Parched soybeans are eaten much like peanuts and are mixed with other foods.

Soybean milk, from which the curd is produced, is consumed but is not a popular drink.

Other food such as formulated foods, combining soybean flour and vitamins and minerals and grain flours, etc. are being developed in Korea.

Consumption of vegetable fats and oils is low in South Korea. People with low incomes reportedly eat meat only once or twice a month; as a result, vegetable oils and fats have not been used extensively for frying and cooking. Consumption of fats and oils is now estimated at around 5.7 pounds per person, of which 3.5 pounds are vegetable oils and fats and 2.2 pounds are animal fats. Daily consumption of fats and oils has been reported at around 2.6 grams per person, of which 1.6 grams are vegetable oils and fats and 1.0 are animal fats. Total consumption of liquid edible oil has been estimated at 25,000 tons (including rice bran oil), or slightly less than 2 pounds per person.

Use of soybeans for feed

Although soybean meal is a relatively new feed ingredient in South Korea, whole soybeans have long been used. These are fed to working cattle, milk cows, horses, and rabbits, as well as to hogs during farrowing. During the heavy work season, liberal amounts of cooked soybeans are mixed with rice straw or hay for feeding to working cattle.

Demand for soybean meal has come about with the initiation of modern poultry and hog industries, especially the former, and mixed feed operations to supply these industries with balanced rations. These industries could be much larger consumers of soybean meal if it were available.

The feed situation is the critical factor that will determine the success or failure of the hog and poultry industries. Both grain and protein supplies, particularly corn and soybean meal, are not always available when needed. As a result, producers are faced with price problems. Prices have fluctuated widely in the past. Larger imports of corn and soybeans (or soybean meal) will be needed in order to fully develop the livestock industry.[2]

---

[2] *Present Status and Future Prospects of Agricultural Processing Related to the Livestock Industry in Korea,* U.S. Operations Mission to Korea Rural Development Division, February 1969.

Production of both broilers and layers is expanding rapidly. Modern breeds and hybrid strains of chickens from the United States have been made available, and U.S. feeding techniques are being introduced. Feed conversions are good although not as good as in the United States. Despite the education and technical work that has been done, feeds have not been adequately balanced with the proper protein because of the limited availability of properly processed soybean meal. Nevertheless, the combination of superior genetic stock, modern management techniques, and improved feeds is bringing better results. When foreign trade is liberalized, the composition of the feeds no doubt will improve, and rations will contain proper amounts of soybean meal, fishmeal, corn, and other ingredients. One large American-Korean firm is now using 500 tons of soybean meal each month and is using an average of 10% soybean meal in its feeds.

Hog production has suffered from a profusion of small farm operations and a lack of commercial enterprises. Feeding has been based on garbage near the large cities, and the use of scientific feeding practices has been extremely limited. However, the government is getting behind commercial hog production, and prospects are that there will be considerable development in this area; as a result the use of soybean meal in this industry will probably increase rapidly.

Korea's mixed feed industry has experienced radical changes in recent years.

In the past, the feed mixing industry consisted of many very small mills, the establishment of which was encouraged by government programs. Prior to 1966, the industry was operating at very low levels—about 17 percent of capacity. Nine of the 46 registered feed mills were not operating at all, and those that were operating were running at 20.5 percent of capacity. There was a critical shortage of materials necessary for producing quality feeds. Many of the mills produced low-quality products. Very little corn and soybean meal were used, and many of the small mills were using hand mixing and handling methods.

Several large mills have been built recently, specializing in producing poultry feed. Two new mills built by Korean/American firms have capacities of 36,000 tons a year or 3,000 a month. A third mill recently completed by the same type of organization has a capacity of 4,500 tons a month or 54,000 tons per annum. Seventeen plants produce about 15,800 to 22,500 tons annually. The total amount of mixed feed produced in 1970 is estimated at around 450,000 to 500,000 tons, 80-90 percent of its poultry feed. Around 540,000 to 550,000 tons are expected to be produced in 1971, and production is expected to reach a million tons by 1976 or 1977, thus more than 150,000-200,000 tons of soybean meal could be used by that time. The total number of mixed feed mills is now 72, of which 25 are in the Seoul area.

The Korean Government has been backing the development of the mixed feed industry and is taking steps to make feedgrains and protein ingredients, particularly corn and soybean meal, available through imports. The Korean Feed Manufacturers Association received a government fund of about $23 million in fiscal 1969 for the purchase of feed ingredients.

Particularly important in the development of Korea's commercial feed, broiler, and egg industries has been the interest of highly competent U.S. hatchery and feed mill operators, who have supplied high-producing modern

SOUTH KOREA: Acreage, Production and Imports of Soybeans

Crop year	Area	Production	Imports	Total supply[1]
	Acres	*Metric tons*	*Metric tons*	*Metric tons*
1960	675,109	129,930	36,655	166,585
1961	716,803	164,836	26,385	191,221
1962	709,919	155,747	16,161	171,908
1963	699,060	156,372	10,118	166,490
1964	694,794	162,857	8,934	171,791
1965	761,374	174,456	–	174,456
1966	681,295	161,303	–	161,303
1967	767,069	201,452	28,799	230,251
1968	781,113	245,257	17,400	262,657
1969[2]	938,384	229,000	24,000	253,000
1970[2]	940,000	243,233	35,265	278,498
1971[2]	N.A.	240,000	[3] 75,000	315,000
1972[2]	N.A.	240,000	100,000	340,000

[1] Apparent consumption. [2] Estimated. [3] Includes 40,000 tons for crushing 1971.

breeds and hybrid strains of chickens, as well as technical information on feed compounding and feeding practices.[3] From this assistance, a permanent demand and increasing imports of U.S. soybean meal have emerged.

KOREA: Age, number, and capacity mixed feed mills, 1970

Daily cap	Age of mills				
	Year built 1963/64 & earlier	Year built 1965/66	Year built 1967/68	Year built 1969/70	Total
	Metric tons	*Metric tons*	*Metric tons*	*Metric tons*	*Metric tons*
25-49	10	3	22	9	44
50-74	10	1	4	2	17
75-99	1	--	3	–	4
100-125	4	–	1	2	7
	25	4	30	13	72

KOREA: Mixed Feed Production - 1969

Ration	Production in 1969	Percent of total	High protein meal	
			Percent of total	Amount
	Metric tons	*Percent*	*Percent*	*Metric tons*
Layer	235,763	64.2	17.1	40,315
Starter	39,815	10.8	23.8	9,476
Grower, Broiler	27,134	7.4	19.8	5,376
Total Poultry	302,712	82.4	60.7	55,167
Swine	26,512	7.2	15.0	4,177
Dairy	12,955	3.5	16.4	2,124
Beef	534	.2	(1)	(1)
Other	24,805	6.7	(1)	(1)
Total	367,518	100.0	--	61,458

[1] Not available.

Source: MAF, Ministry of Agriculture & Forestry first two columns.
NACF, National Association Compound Feed (last 2 columns).

KOREA: Mixed Feed Ingredients, 1969

Ingredient	Type of Ration				
	Starter	Grower	Layer	Swine	Dairy
	Percent	*Percent*	*Percent*	*Percent*	*Percent*
Grains	59.9	60.5	55.5	40.0	26.2
Beans	13.3	16.9	22.5	42.0	53.3
High Protein Meal	23.8	19.8	17.1	15.0	16.4
Inorganic	2.6	2.6	4.3	2.0	2.8
Supplement	.4	.2	.6	1.0	1.3
	100.0	100.0	100.0	100.0	100.0

[3] *Present Status and Future Prospects of Agricultural Processing Related to the Livestock Industry of Korea,* United States Operations Mission to Korea Rural Development Division, February 1968.

SOUTH KOREA: Livestock and Poultry Numbers

Item	1965	1966	1967	1968	1969
	Number	*Number*	*Number*	*Number*	*Number*
Korean cattle	1,313,437	1,289,695	1,242,648	1,193,469	1,202,360
Beef cattle	805	1,139	2,132	(1)	–
Dairy cattle	6,612	8,471	10,360	13,760	18,800
Swine	1,381,873	1,457,309	1,296,109	1,395,685	1,338,000
Poultry	11,892,612	14,007,723	17,079,169	25,967,810	22,651,000
Broilers	(1)	(1)	(1)	[2] 10,000,000	[2] 20,000,000
Ducks	209,540	232,619	226,722	(1)	(1)

[1] Not available. [2] Trade estimates. 1970 - 30 million broilers

KOREA, Mixed Feed Production[1]

Item	1967	1968	1969
	Metric tons	*Metric tons*	*Metric tons*
Commercial	110,000	210,000	367,000
Mixed on farms	10,000	10,000	10,000
Soybean meal included	300	10,000	(2)

[1] Mainly for poultry. [2] Not available.

SOUTH KOREA: Estimated Use of Soybean Meal in Poultry Feed[1]

Feed type	1968	1969	1970	1971	1972	1973
	Metric tons	*Metric tons*	*Metric tons*	*Metric tons*	*Metric tons*	*Metric tons*
Broiler	10,700	13,900	24,810	37,600	42,100	46,500
Layer	7,800	8,600	14,100	20,200	21,700	23,100
Total	18,500	22,500	38,900	57,800	63,800	69,600

[1] Based on estimated demand for poultry meat from Livestock Division, Ministry of Agriculture, November 1969, and others, and average percentage use of soybean meal.

SOUTH KOREA: Oilseed Crushing Mills, 1968

	No. of plants	Facilities			Oilseeds crushed
		Screw-press	Expellers	Solvent extraction	
Members[1]	54	48	121	29	40,000
Nonmembers[1]	42	9	79	6	20,000
Total	96	57	200	35	60,000

[1] Members of Korea Oil Manufacturers' Cooperative.

Source: Korea Oil Manufacturers' Cooperative.

THE PHILIPPINES

The Philippines is a potential market for 60,000 to 80,000 tons annually of U.S. soybean meal in the next 2 to 5 years for use in mixed feeds for its booming broiler industry. U.S. exports there in the 1969-70 marketing year totaled 49,076 tons, nearly two-thirds more than the 30,399 tons shipped in 1966-67. Poultry meat consumption is rising rapidly, partly as a result of the improved quality and quantity of meat produced from broilers fed on soybean meal and available at comparatively low prices. The demand for soybean meal exists despite domestic production of large quantities of copra cake and meal, which cannot replace soybean meal in poultry and hog rations.

The Philippine Government, because of the availability of large quantities of domestic coconut oil, has placed a high tariff on imports of soybeans for crushing for oil and meal. Soybeans formerly were brought into the Philippines by NMARCO, the national marketing corporation. Crushers had to pay a 15-percent handling fee, but the beans were exempt from tariff duties. Today, the tariff is 150 percent of what it was in 1966. The tariff on soybeans amounts to 25 pesos per kilogram or $62.50 per metric ton, over 50 percent of the import value.[4]

This tariff has made the processing of U.S. soybeans impossible. Crushing of U.S. soybeans dropped immediately upon its imposition. U.S. shipments of soybeans to the Philippines declined from 1,231,000 bushels in 1965-66 to 11,000 in 1966-67, and since that time to nearly zero. On the other hand, U.S. shipments of meal jumped from 3,138 short tons in 1965-66 to 30,399 in 1966-67, 47,679 in 1967-68, and 43,844 in 1968-69. Calendar year 1969 shipments were a record 49,330 tons.

The tariff on imported soybean meal is much lower than that on soybeans, partly owing to the demand for meal for poultry and hog feeds. The tariff on soybean meal was reduced from 25 percent to 10 percent ad valorem on January 25, 1964, thus making it more profitable for the Philippines to import soybean meal than to process meal domestically from imported soybeans.

Moreover, import restrictions and credit problems have not had an effect on sales of U.S. soybean meal in 1970. The Central Bank imposed increasingly strict credit and import restrictions in November 1969. A number of imported commodities, including soybean meal, formerly exempt from prior-deposit requirements were made subject to a prior deposit of 25 percent for 90 days, increasing import costs. The poultry and mixed feed industries sought relief from this restriction, as it was thought it would result in lower soybean meal imports and a consequent reduction in the efficiency of poultry production.

Foreign exchange is also a problem. Strong efforts by the Philippine soybean crushing industry failed to obtain long-term credit from U.S. suppliers of soybeans for crushing in the Philippines. Such credit, the industry claims, could possibly have made crushing in the Philippines profitable by reducing total costs. By fall-1970, no sizable shipments of soybeans had been made from the United States to the Philippines.

Notwithstanding the problems involved in importing soybeans and soybean meal into the Philippines, imports of meal will probably continue to increase in 1971 as the demand for it has reportedly been growing at a rate of some 10-15 percent, along with poultry production, which showed an average growth rate of 14.5 percent from 1961 to 1969.

Domestic soybean production

Promising soybean varieties with high yields are being developed in the Philippines and cultivated under irrigation. Several U.S. and Taiwanese varieties have been crossed with Philippine or Spanish varieties to produce a variety that is highly productive under local climatic conditions. It has been reported that the new varieties, grown under irrigation, have yielded as much as 3,000 kilos per hectare (2,677 pounds or 44.6 bushels per acre) at an experiment station.

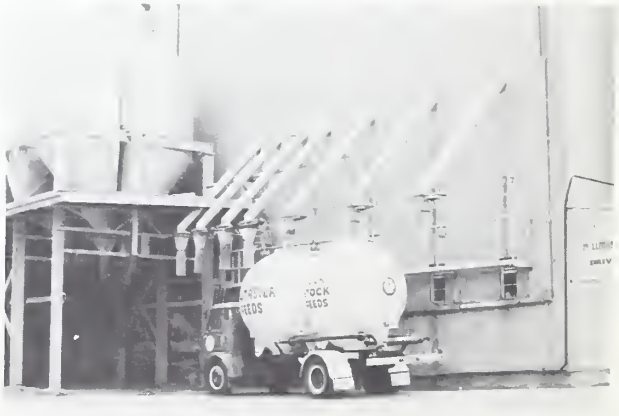
However, commercial production of soybeans is low. About 2,000 metric tons are being produced annually on 1,000 hectares of land. The cost of production is high when compared with rice—the staple crop—despite the high yields that have been achieved. Farmers require 600 pesos or US$150 per metric ton ($4.09 per bushel) to grow soybeans, which compete with rice for available irrigated land. The cost also appears high when one considers that soybean meal can be imported at a 10-percent duty.

---

[4] Tariff from 1968 Tariff and Customs Code 11, May 1968, Atty. Civila Monte Jo, published by the Philippine Tax Journal, Manila.

Left, a wholesale poultry market in Hong Kong, where poultry production and consumption are increasing, thus giving a boost to greater use of soybean meal in mixed feeds; above, bagged soybeans are unloaded from barges in South Korea.

Right, a grove of coconut trees in the Philippines, where copra is an important oil-bearing crop. Below left, feeds are delivered to poultry houses in Australia; right, modern bulk feed distribution, also in Australia.



Right, oil palm fruit from a young, high-yielding variety in Malaysia. Below left, houses for producing poultry under controlled conditions in Singapore; right, distribution of poultry feeds made with soybean meal in Singapore.

Left, bulk soybeans and corn are unloaded from an oceangoing vessel to smaller boats for transport to shore in South Korea; below, this port scene in Singapore is typical of older harbor areas, while modern facilities have been built at other locations.

The crushing industry

The Philippines has two modern continuous solvent-extraction mills for processing soybeans; both are located on the water at Pasig, near Manila. Under the present tariff rates for soybean imports, it appears that these mills will probably not be used for soybean processing in the near future. When they were in use, the imported soybeans were brought in by barge or lighter from the main harbor in Manila.

These mills each have a capacity to crush 125 to 150 tons of soybeans per day and together could handle 75,000 to 90,000 tons in a normal operating year. This would amount to nearly $10 million in soybean sales.

In the largest mill the equipment is used several days a month on corn germs to produce corn oil. But without imported soybeans to process, this modern "Lurgi" type plant—capable of 125 to 150 pounds per day—stands idle most of the time.

The second solvent-extraction mill has a capacity of 125 tons per day. It is a modern "De Smet" type mill and has all the latest auxiliary machinery. However, this plant has not crushed soybeans for the last 2 years.

There are also 17 large and many small copra expelling mills, including several large prepress solvent-extraction mills, but these do not crush soybeans or other oilseeds. One mill at Cebu, possibly the largest copra crushing mill in the world, can handle 650 tons per day. Total annual crushing capacity for copra has been estimated at from 900,000 to 1.2 million tons.

While large supplies of coconut oil are available in the Philippines, per capita consumption of vegetable oils has been low. In 1960 consumption was estimated at around 15.4 pounds per person. By 1970 it was probably still around this level. However, the government is backing increased consumption and would like to see some of the coconut oil now being exported move into domestic channels. This, plus rising incomes and a population of 38.5 million that is growing at the rate of 3.5 percent annually, should bring about increased consumption of domestic coconut oil.

The large supplies of coconut oil available make it difficult to market soybean oil in the Philippines. This has not been a problem so long as soybeans have not been crushed and only meal has been imported.

The corn oil available in the Philippines is high in price relatively to coconut oil.

Poultry and mixed feed industries

Soybean meal is considered an essential ingredient in feed formulas for poultry and, to a lesser extent, for hogs. Soybean meal has enabled these industries to progress much faster than they otherwise could have in the last 10 years. To maintain the expansion of these industries, the Philippines will also have to maintain its supplies of soybean meal. Without imports of soybean meal and minor quantities of other feed ingredients, the poultry and hog industries probably would have to take a setback.

Poultry meat production has increased rapidly in recent years. The Philippines has developed highly efficient feed-conversion rates, and the number of broilers produced each year has risen to over 70 million birds. This is equivalent to about 90,000 tons of meat. Feed-conversion ratios in commercial enterprises have reached levels as low as 2.4 to 1 with the use of balanced rations containing domestic corn and imported soybean meal. The national average is higher because of an increase in the use of domestic meals which do not provide the needed amino acid balance to maintain the efficient conversions obtained using soybean meal.

The mixed feed industry in the Philippines has been expanding rapidly with the development of a modern poultry and livestock industry. The demand for soybean meal has grown more directly with the demand for poultry feed than with that for hog or cattle feed. Total production of mixed feed is estimated at around 600,000 tons each year, with most of the feeds being produced for the expanding poultry and hog industries.

There are 16 to 18 large feed processing mills in the Philippines, and the output of the industry is expanding at a rate of 10 percent a year. A large part of the mixed feed being produced is now being shipped directly to poultry producers under integrated-type contracts, whereby the feed manufacturer supplies the poultry producer with chicks and feed and buys back the chickens when they have reached marketable age and weight. New U.S. and Canadian hybrid chickens are being used, and excellent feed conversions are being obtained with rations high in soybean meal.

One Philippine feed company uses 3,000 metric tons of U.S. soybean meal each month, and another uses 1,500 to 2,000 tons. Total consumption of soybean meal was around 50,000 tons in 1970, indicating that mixed feeds averaged about 8 percent soybean meal.

When sufficient meal is available, Philippine feed mixers use as high a percentage of soybean meal as is used in the United States for broiler feeds (15 percent in starter feeds and up to 20-25 percent in others). Around 5 percent

soybean meal is used in layer feeds. Only small amounts (5 percent) are used in hog feeds because of the limited, unstable supply and high price of soybean meal.

Soybean meal (44-percent protein) is not obtained from large U.S. exporters and importers with offices in the Philippines. Most American suppliers ship bulk soybean meal out of Atlantic ports to Manila; however, some suppliers to the Far East ship it from Gulf ports.

SINGAPORE AND MALAYSIA

Soybean meal is finding new markets in Singapore and Malaysia as an ingredient in mixed feeds for the new intensive poultry and livestock industries. Auxiliary feed industries have been established.

The Singapore Government has a program at its new Central Research station at Sembawang for the development and improvement of the country's livestock industry. Also, one private concern has taken effective steps toward improving livestock breeds, particularly hogs and poultry (both broilers and layers). As a result, this small country of 2 million people has made substantial improvement in its poultry and livestock standards, management, and production, and it is becoming a steady market for soybean meal.

Singapore in 1970 opened a modern solvent-extraction plant for crushing soybeans and has suddenly become a market for up to 75,000 tons of U.S. soybeans annually. Over 35,000 tons of U.S. soybeans were marketed in September 1969-July 1970. The previous years imports from the U.S. were insignificant. Marketing conditions in this area are rather complex, but the operators of this mill have worked out shipping arrangements to obtain soybeans from the United States under favorable terms.

Malaysia, with over 10 million people to feed, is also making steady progress in developing its poultry industry. Its mixed feed industry has expanded rapidly.

In both countries increased returns using soybean meal and corn rations have induced more farmers to begin scientific production of poultry and hogs, using improved breeds of animals. They are providing hygienic facilities and nutritionally balanced diets. U.S. and Canadian breeds of broilers and layers have been introduced and are being adapted to local conditions. Fed on soybean and corn rations, these breeds convert feed more efficiently and make better weight gains than local breeds. In the hog industry there has been a gradual influx of Western breeds that can also efficiently utilize modern balanced rations to improve pork production. The result has been fast growth and improved carcass quality.

In summary, soybean meal has become a highly desired feed ingredient in Singapore and Malaysia to increase the production of quality fresh lean pork, brown eggs, and brown and red feathered breeds of broilers desired by local consumers. However, consumer habits are changing, and the production of white eggs and U.S.- and Canadian-type broilers is expected to follow at increased efficiency levels.

Soybean crushing

A soybean crushing plant of 250 metric tons daily capacity (75,000 tons per annum) was built at the Jurong Industrial Estate in Singapore by the United Vegetable Oil Company (Pty.), Ltd., in 1969 and started operations in January 1970. The plant is a continuous solvent-extraction facility of the "De Smet" type, and its equipment was imported from Belgium at a cost of over $2 million. It can produce about 200 tons of soybean meal daily for animal feed and also has a refinery to produce 50 tons of refined soybean oil per day. Nearly half the meal output of this plant will be used in Singapore for poultry and hog feeding; the balance of the approximately 30,000-50,000 tons produced annually will be exported, along with a considerable amount of the soybean oil not consumed locally.

The plant is a joint venture of Singaporan, American, Taiwanese, and Thai businessmen, with 55 percent of the capital supplied from abroad. The authorized capital is $5 million, of which $3 million is paid up. The new mill is the first in the area able to receive soybeans and other oil-bearing materials direct from a ship's hold by a pneumatic system similar to those used at many European mills located on water.

Two important problems that still must be solved are: (1) Can the mill operate profitably on U.S. soybeans and continue to pay the present freight rates from the United States? (2) Can ample markets be established for selling the entire production of soybean meal and oil? Indications are that with the help of the Singaporan Government both these questions could be answered affirmatively. Soybean products excess to Singapore's needs might possibly be traded on a government-to-government basis.

A new oil mill of the screw-press type, Kwang Joo Seng (Malaysia), Ltd., was also opened recently in Singapore. This plant will crush primarily peanuts for oil and meal. Singapore has five screw-press copra mills, the largest of which has a crushing capacity of 150 metric tons per day/capacity of the others is around 50 tons. All operate at less than 50 percent of capacity.

Peanut and coconut oils are blended in Singapore so that the essence of peanut oil is maintained, and consumers—who prefer peanut oil—believe that they are getting pure peanut oil. Locally produced soybean oil is expected to partially replace the other blending oils used.

Malaysia has a large copra crushing industry with a total of around 70 mills and has developed a palm oil crushing industry. About 20 of the copra plants refine coconut oil. The copra crushing mills operate at around 60 of capacity. Some of the coconut oil and copra meal produced is used locally. As far as is known, no soybeans are crushed in Malaysia.

Shipping

Shipping time for soybeans from the U.S. Gulf ports to Singapore is 36 days, compared with about 6 days from Dairen, the Mainland Chinese port in Manchuria. In late 1969 the ocean freight rate on U.S. soybeans was fixed at $13.50 per metric ton. During 1970 rates were somewhat higher, but the entry of U.S. soybeans into this market has been made possible by the economy of large shipments. Present rates have returned to around $12.50 per ton. Soybeans are sold c.i.f. Singapore on the basis of samples and open letter of credit to the United States.

The Mainland Chinese have always been able to price their food soybeans c.i.f. Singapore at a price that is lower than those of other suppliers, and thus have been able to control the bulk of the food soybean market. Whether the Chinese will enter the soybean crushing market is not known. However, at present soybeans for crushing are being bought from the United States at highly competitive prices.

Feed production and use

There are 20 licensed feed mills in Singapore and slightly more in Malaysia. They produce balanced compound rations that include soybean meal when it is available. Development of balanced feed formulas using synthetic amino acids also is taking place.

Singapore has three large mills and around 17 small ones. One mill was built recently at a cost of US$1.1 million. Because a large portion of the feedstuffs used has to be imported, excessive amounts of low-quality materials are often used. As a result, the government has taken steps to license feed mills in order to insure that animal feedstuffs available in the local market are of at least minimal quality. Total production of mixed feed from 1967 to 1969 and estimated output in 1970 are shown below, in metric tons:

	1967	1968	1969	1970
Poultry feed	131,000	145,000	174,000	210,000
Hog feed	38,000	52,000	72,000	90,000
Total	169,000	197,000	246,000	300,000

Production has increased over 45 percent in the last 2 years. Percentage-wise, hog feed production has increased more than that of poultry feed, but the total tonnage increase in poultry feed has been about one-third more than that of hog feed. By the end of 1970 production should have totaled around 300,000 tons, and soybean meal demand, around 30,000 to 40,000 tons, or more than half the production of Singapore's new soybean crushing plant.

In 1968 Singapore produced around a million hogs (935,000), 23 million chickens, and 1.5 million ducks; egg production was 315 million.

Malaysia produced around 300,000 tons of mixed feed in 1969 for its poultry industry. Malaysia will, no doubt, be able to use considerably more soybean meal to supplement its present supplies of copra meal. It is expected that meal produced in Singapore will partly fill this demand.

Modern livestock and poultry breeds that can take advantage of soybean meal and corn rations are being adopted in place of the former crosses with domestic animals in both Malaysia and Singapore. Broiler chicks from the West Coast of the United States are being used. The mini-Leghorn layer and broilers and layers from Iowa and

Connecticut are being tested for adaptability to conditions in both countries. Hog varieties imported from the United States and Western Europe that are now being developed in Singapore include Yorkshire, Hampshire, Poland, Large White, Landrace, and Duroc. The new breeds of poultry and hogs are expected to increase rapidly in number.

The United Nations Food and Agriculture Organization is assisting in the development of livestock and poultry production, which points to establishment of a permanent industry and, consequently, a steady market for soybean meal.

Singapore's poultry and hog raisers have been able, through the use of modern balanced feed rations with relatively high percentages of soybean meal, to produce eggs and meat at competitive prices. This has been possible despite the fact that over 95 percent of the animal feedstuffs must be imported.[5] Feedstuffs account for 70 percent of total production costs.

Singapore has made rapid progress in broiler nutrition from 1960 to the present. A 1.5-kilogram (3.3 to 3.5 lb.) broiler can now be produced at least cost in 9 weeks with a 2.2 to 1 feed conversion ratio (2.2 lb. of feed to produce 1 lb. of chicken), using 15 to 20 percent or more of soybean meal, when available. This compares to a feed-conversion ratio of 2.9 to 1 in 1960.

The feed-conversion rate for hogs, using soybean meal rations, has been reduced from 3.3 pounds to 3 pounds per pound of hog.

SINGAPORE: Imports and Exports of Soybeans

Year	Imports		Exports	
	Long tons	*C.i.f. Singapore dollars*	*Long tons*	*F.o.b. Singapore dollars*
1964	15,338	5,189,613	7,351	2,774,882
1965	19,671	7,541,434	7,983	3,333,724
1966	12,455	5,058,828	6,950	2,722,755
1967	14,128	5,928,047	8,417	3,141,148
1968	12,450	5,117,885	8,195	2,969,449
1969-70	[1] 35,016	N.A.	N.A.	N.A.

[1] U.S. exports.

Note: One Singapore dollar (S$) = US$0.33; US$1.00 = S$3.03.

Source: Department of Statistics, Singapore.

SINGAPORE: Imports of Soybeans by Origin

Origin	1968		1967	
	Long tons	*C.i.f. Singapore dollars*	*Long tons*	*C.i.f. Singapore dollars*
Brazil	295	120,794	492	205,640
Cambodia	22	8,863	–	–
China, Mainland	10,887	4,471,467	12,310	5,175,339
Kenya	50	18,704	–	–
Tanzania	69	31,006	10	3,713
Thailand	880	365,093	953	403,904
Other African countries	160	60,688	346	134,312
Malaysia	87	41,270	3	1,547
Portuguese Timor	–	–	13	3,592
Total	12,450	5,117,885	14,127	5,928,047

Source: The Department of Statistics, Singapore.

[5] Pig and Poultry Research and Training Institute, Department of Primary Production.

MALAYSIA:[1] Imports and Exports of Soybeans

Year	Imports		Exports	
	Long tons	*C.i.f. Malaysian dollars*	*Long tons*	*F.o.b. Malaysian dollars*
1964	17,361	6,583,680	5	4,030
1965	16,643	7,035,354	7	3,064
1966	16,072	6,641,388	3	1,409
1967	17,408	6,977,740	6	2,399
1968	18,533	6,983,959	2	855

[1] West Malaysia.

Note: One Malaysian dollar M$ = US$0.33; US$1.00 = M$3.03.

Source: The Department of Statistics, Singapore.

MALAYSIA:[1] Imports of Soybeans by Origin

Origin	1968		1967	
	Long tons	*C.i.f. Malaysian dollars*	*Long tons*	*C.i.f. Malaysian dollars*
Brazil	282	100,045	141	52,046
Burma	–	–	6	2,129
Cambodia	11	2,749	–	126
China, Mainland	13,088	5,216,511	12,156	4,972,498
Formosa	45	17,623	20	7,612
Hong Kong	492	205,229	34	14,351
India	27	9,217	22	7,640
Indonesia	2,168	430,392	1,511	475,319
Kenya	–	–	33	12,232
Korea, Rep. of	3	1,020	6	2,738
Singapore	7	2,086	13	3,257
Tanzania	22	5,722	52	22,249
Thailand	2,221	934,608	3,060	1,281,068
United States[2]	62	20,992	69	24,807
Vietnam, Rep. of	76	27,330	192	66,292
Other African countries	4	1,637	93	33,376
Brunei	24	8,468	–	–
Japan	1	330	–	–
Total	18,533	6,983,959	17,408	6,957,740

[1] West Malaysia.

Source: The Department of Statistics, Kuala Lumpur.

AUSTRALIA

Australia, with nearly 14 million people, has been a small and competitive market for U.S. oilseeds and products, including soybeans, safflowerseed, soybean meal, and soybean oil. A market for about 27,000 metric tons of U.S. soybean meal in fiscal years 1968 and 1969, 31,078 tons in marketing year October 1969-September 1970, resulted from the recent rapid expansion in the poultry and mixed feed industries and the development of scientifically balanced rations. With the steady increase in poultry production, poultry consumption is showing a spectacular increase; per capita consumption was up from 13.8 pounds in 1966 to over 20 pounds in 1969. This increase has taken place despite the largest per capita consumption of red meats of any country in the world.

Indications are that demand for U.S. 49-50 percent high protein soybean meal could increase to 75,000-100,000 tons in the next 5 to 10 years, but imports from the United States may drop off as the domestic soybean crop expands. However, at the present point of development of new soybean varieties adaptable to Australia, U.S. soybean meal will be needed for several more years until the Australians are able to produce and crush

their own soybean crop. Imports of soybean meal from the United States are expected to reach a total of 50,000 tons in 2 or 3 years.

Australia does not usually crush large quantities of U.S. soybeans. However, interest in doing so exists, and in the 1969-70 marketing year 212,000 bushels, or 5,800 tons were imported from the U.S. for crushing for the first time in recent years. The country's first continuous solvent-extraction crushing plant has been proposed.

Oilseed production has been hard hit by severe droughts in the past three years and 1970 has been no exception. Importation of oilseeds, soybeans, and safflower from the U.S., while contrary to the country's present oilseed programs may be exported to fill future gaps in production.

Although soybean meal is in demand among feed mixers, most of them use only 8-9 percent soybean meal in broiler rations because of the high cost compared with local ingredients. U.S. 49-50 percent soybean meal has been imported in bags but renewed efforts are being made to import it in bulk. In some chicken rations they use only 5 percent, compared with double that amount used in the United States. Present broiler production periods are from 8½ to 9 weeks, but feed-conversion ratios are not so efficient as in the United States for several reasons. First, the Australians have depended on local strains of chickens for their egg and broiler industries; and second, there is an abundant supply of local feedstuffs (e.g., meat meal) that provide lower cost rations although they do not give the efficiency of rations high in soybean meal. Australia has had a surplus of around 250 million bushels of wheat, some of which has been fed to animals for carbohydrates and proteins. Hogs are fed almost entirely by free grazing and on domestically produced grains and other feeds, and the hog industry currently does not appear to offer a market for soybean meal feeds.

Soybean oil has an established demand as an industrial oil in the paint and drying oils industry, but only limited quantities are used for edible purposes or in margarine.

Imports of U.S. soybean oil fell from 7,759,000 pounds in the 1967-68 crop year (October-September) to 2,114,000 pounds in 1968-69. However, due to the shortages resulting from the drought shipments in 1969-70 increased and totaled 8,262,000 pounds of soybean oil and 200,000 pounds of cottonseed oil.

In recent years Australia has imported considerable quantities of soybean oil from the United States, West Germany, the Netherlands, and Japan. In late 1969 soybean oil was being brought from Europe and the United States at a landed cost of around $1.45 (duty paid) per gallon, with a 40-cent per gallon tariff. A tax increase in early 1970 brought the cost to around $1.60 per gallon.

Ocean freight from the United States on soybean oil has been as high as $35 per ton.

U.S. safflower seed is finding a good market in Australia as a result of declines in domestic production resulting from drought in the last few years. Imports of 8,734 tons, oil equivalent, were made in 1967-68 and safflowerseed imports in 1969 were 12,406 tons.

Domestic soybean production

A strong effort is being made in Australia to develop varieties of soybeans that can be produced profitably under irrigated conditions. According to many technicians, this has been a difficult task, and only in the last few years have many cultural problems been solved and some measure of success achieved under irrigated conditions. Dryland production as carried on in the United States has not proved feasible. The success has been mainly in central New South Wales and northern Queensland, and irrigated production is expected to expand in the inland river valleys of these two States. Expansion may be limited to some extent by unavailability of seed of suitable varieties.

Several U.S. soybean varieties have been tested—such as Hill, Bragg, and Wayne—and crossed with other varieties, and it now appears that at least two will make the breakthrough. Should the most promising new varieties, Telstar and Semstar, produce as expected, then soybeans will be pushed as a replacement for wheat on irrigated land. Australia currently has large stocks of wheat and is promoting the diversion of wheat land to other crops, of which oilseeds and cotton are getting the greatest attention. Corn, sorghum, and sunflowerseed also compete for irrigated land.

Soybean yields have varied greatly. One farmer in Queensland achieved yields of nearly 50 bushels per acre under irrigation. Research station yields also have been between 40 and 50 bushels per acre. In New South Wales trials on 15 varieties yielded 24 to 38 bushels per acre during the 1964-66 period. Yields on irrigated land should run about 50 bushels per acre for soybean production to be profitable.

An estimated 20,000 to 25,000 acres of soybean, all irrigated, were expected to be planted in New South Wales in 1969-70. Yields of around 40 bushels or more were anticipated. Soybeans are planted in September and

harvested as late as May in New South Wales. In Queensland they are planted as a second crop in December and are harvested 120-140 days later in May or June in rotation with wheat, which is harvested in March.

In 1969-70 farmers received $3.00 per bushel for soybeans, delivered to Sydney basis.

Production of other oilseeds

Australia is making a strong effort to become independent in the production of both edible and industrial vegetable oils and oilseed meals. Recent research, both scientific and economic, has been concentrated on safflower, soybeans, and flaxseed, but experiments also have been conducted with sunflowerseed and rapeseed. However, because of severe climatic vicissitudes, such as the prolonged drought in 1968 and 1969, attempts to adapt many plants have proved difficult. For example, the winter crop (1969-70) of safflower in Queensland was limited to seed production because of poor rainfall at planting time. In 1966-67 plantings were made on 88,803 acres, and production reached 23,037 tons. Once varieties of safflowerseed, soybeans, or other oilseeds become productive under Australian conditions, there is no doubt that an independent status will be achieved. Because of overproduction of wheat, production of oilseeds on diverted lands could be expanded rapidly.

New South Wales and Queensland are the States where most of the oilseeds are produced, but Victoria and Western Australia are also producing small quantities of flaxseed and cottonseed. Some flaxseed and olives are being produced in South Australia, and Western Australia.

Generally, oilseed production is as follows, by area. Safflowerseed in New South Wales and Queensland; peanuts, sunflowerseed, and soybeans in New South Wales and Queensland under irrigation; flaxseed in Victoria, New South Wales, Queensland, South Australia, and Western Australia; cottonseed in New South Wales; and rapeseed mainly in Victoria although interest in this crop is developing in the southern part of Western Australia.

Safflower.—Queensland is the major safflower producing area. Safflower is not an irrigated crop, and the area in this crop was reduced from around 95,351 acres in 1967-68 to 50,000 in 1968-69 and almost nothing during the 1969-70 season because of drought at planting time. Despite the losses, interest in safflower is expected to continue. The adaptability of safflower to local conditions is being assessed and the availability of better land after the introduction of wheat quotas may have a boomerang effect on the planting of safflower in coming years.

Planting of safflower in New South Wales in 1969-70 amounted to only 17,000 acres. Irrigated production in New South Wales has been discouraged because of varietal problems. Victoria also planted safflower for the first time, and 2,000 acres were sown.

Because of the possible reduction in the present safflower crop, increased imports of safflowerseed and oil from the United States can be expected. Total imports in 1969 were 14,655 long tons of safflowerseed, mostly from the United States and 332,517 gallons or about 2.5 million pounds of safflowerseed oil, also largely from the United States.

Sunflower.—High oil-yielding varieties of sunflower have been introduced into Australia, and adaptability of this oilseed to Australian conditions may result in a substantial increase in irrigated acreage in the future. Production is developing along with that of soybeans in the inland valleys.

Cottonseed.—Cottonseed production is linked with that of cotton, which is expected to increase slowly because of the limited irrigated land and the present low price support scheme. Cottonseed has grown into a sizable crop with the expansion of cotton in New South Wales and Queensland.

Flaxseed.—Flaxseed competes with wheat for irrigated land in New South Wales, and lower yields of flaxseed limits its production. About 50,000 acres were sown to this crop in Western Australia in 1970.

Rapeseed.—Wheat farmers in Victoria may try to grow rapeseed as a dry-land replacement crop for wheat. About 20,000 acres are planted in Western Australia.

Other oilseeds.—Peanuts are grown largely for edible use, and there is no indication that this crop will be produced for crushing. Crambe abysinica is being tried experimentally in Western Australia.

Oilseed crushing industry

The quantity of soybeans crushed in Australia is comparatively small compared to the crushing of cottonseed, safflowerseed, and flaxseed. While the crushing of oilseeds has been expanding in recent years, the industry has not

been able to supply the country's requirements for vegetable oils, and around a million (2 million in 1967) gallons of soybean oil have been imported each year (around 7-8 million pounds). The droughts of recent years, particularly in the large oilseed-producing areas of Queensland, have made imports of oilseeds and oil-bearing materials necessary, because production fell far below needs for domestic vegetable oil consumption. Imports of U.S. soybeans in 1969-70 for the first time for crushing has been an indication of this shortage.

Nevertheless, domestic oilseed producers believe that in coming years they will be able to supply the country's requirements for oil and meal. Oilseed crushers have been pushing programs to persuade farmers to grow oilseeds and have been responsible for establishing guaranteed prices for seed. Crushers have assumed a continuing liability in guaranteeing these prices to growers and would like to see the government take over.

The guaranteed prices (in Australian dollars, A$1.00 = U.S.$1.12) paid farmers for oilseeds by crushers are:[6]

Safflowerseed	A$98	per ton delivered Sydney.
Sunflowerseed	A$96 - $100	per ton delivered Sydney.
Flaxseed	A$125 - $130	per ton delivered Sydney, Melbourne, and Brisbane.
Rapeseed	A$100	per ton delivered Sydney.
	A$100	per ton delivered Melbourne.
Soybeans	A$100	per ton delivered Sydney.
Peanuts	No guaranteed price	(last year A$220 per ton).
Cottonseed	No guaranteed price	(currently A$48 per ton, ex cotton gin).

The large oilseed crushing mills located at Melbourne and near Sydney use screw presses almost exclusively for crushing oilseeds. The Sydney mills process cottonseed copra, flaxseed, and peanuts, as well as other oilseeds when they are available. The mills at Melbourne crush mainly flaxseed. A new plant is under consideration there for crushing both flaxseed and rapeseed. A country expeller (screw press) mill for handling flaxseed and other oilseeds, such as soybeans, has been erected on the railroad to handle rail freight at Moree, New South Wales. A small flaxseed crushing mill is located in Perth, Western Australia. The Cotton Marketing Board of Queensland operates a cottonseed oil mill and two gins. The oil mill, a screw-press mill, is located at Whinstanes, Brisbane. The mill processed around 10,000 tons of cottonseed in fiscal 1969 and about 7,000 tons in 1968. Also, some 510 short tons of safflowerseed were crushed in fiscal 1968.

Present crushing capacity of the industry is estimated at well over 150,000 metric tons and possibly close to 200,000 tons.

Should the soybean crop expand significantly, one of the country's largest crushers has indicated that he would then be interested in building a modern solvent-extraction plant to handle the crop.

Mixed feed and poultry industries

Australia has a modern mixed feed industry, and over 20 large concerns are producing balanced feeds. The industry has a capacity to produce nearly 1.5 million tons of feeds. Poultry feeds are the major type of feed produced, accounting for 77 percent of the total produced in 1968-69. Around 80 percent of the poultry feeds are produced as pellets and crumbles. Mixed feed production increased between 1965-66 and 1968-69 from 1,080,317 tons to 1,230,701 tons.

Total consumption of oilseed meals has increased from 108,303 long tons in 1965-66 to 127,897 tons in 1968. This includes linseed, coconut, cottonseed, peanut, rapeseed, safflower, soybean, and sunflower meals.

Recent experiments with broiler chickens in Australia have confirmed U.S. research indicating that the amino acid lysine, in which soybean meal is particularly high, is the first limiting amino acid for chick growth in wheat protein rations, and that wheat diets should be supplemented with soybean meal. This situation points the way for increased use of soybean meal, whether domestically produced or imported. A new high protein safflower meal (42 percent to 44 percent protein—14 percent fiber) is now available in Australia and has been used with success in egg production, but supplementation with lysine, particularly soybean meal, and other amino acids is required.

Scientists in Australia have reported that, because new varieties and hybrid strains of broilers and layers cannot be imported from the United States and Canada, the country cannot attain the most economical feed-conversion

[6] Report of Special Advisory Authority; under Part V of the Tariff Board on Vegetable oils, December 12, 1969.

ratios. Domestic varieties still cannot utilize grain/soybean meal rations as efficiently as the U.S. and Canadian breeds despite the fact that considerable progress has been made toward developing breeds that can.

Poultry meat production in Australia has increased regularly. Total broiler meat production increased nearly 7,000 tons in 1968, equivalent to a demand for over 4,000 tons of soybean meal. Total production of poultry meat in 1969 was around 114,669 metric tons, and most of this (97,750 tons) was broiler meat. Using normal feed formulas and the most efficient feed-conversion ratios of around 2.6 or 2.5, it would appear that Australia could possibly use around 75,000 tons of soybean meal for both broiler and layer feeds. Assuming a normal rate of growth, it would appear that 100,000 tons of soybean meal could be used annually in the next 5 to 10 years.

Further expansion of poultry production could be limited by the record supplies and low prices of lamb. Prices for this meat make it highly competitive with chicken. However, beef prices remain high, and this may help increase the demand for poultry and, therefore, soybean meal.

Margarine

Australia has six margarine companies that produced some 65,000 tons of margarine in 1969. Output of table margarine is restricted by law not to exceed 16,000 tons. This measure was taken to protect the domestic butter industry. The balance of the margarine produced is cooking margarine.

Margarine is made with a high percentage (40 percent is the legal minimum) of animal fats and thus is not a potential outlet for more vegetable oils. A changeover to the use of more vegetable oils in the margarine industry is a possibility for the future if Australia begins to produce more unsaturated vegetable oils.

Production of margarine, butter, and shortening from 1965 to 1969 were as follows:

	1965	1966	1967	1968	1969[1]
	Long tons	*Long tons*	*Long tons*	*Long tons*	*Long tons*
Margarine	53,600	56,800	55,500	59,200	65,000
Butter	203,900	217,500	211,500	192,200	214,500
Shortening	25,700	27,400	27,800	30,300	37,900

[1] Preliminary.

AUSTRALIA: Imports of vegetable oils[1]

Type of oil	1964-65	1965-66	1966-67	1967-68	1968-69[2]
	Long tons	*Long tons*	*Long tons*	*Long tons*	*Long tons*
Safflower[3]	3,529	3,835	5,511	8,734	1,407
Soybean[3]	1,283	4,508	4,857	8,115	3,370
Rapeseed	3,903	5,664	4,996	4,950	5,490
Peanut	7,557	8,275	8,264	6,010	3,782
Sunflower	78	137	56	879	1,423
Cottonseed	2,479	1,197	87	5	32
Coconut	20,029	21,580	22,374	19,309	16,221
Palm kernels	977	965	522	1,031	486
Palm	2,362	3,154	3,177	2,614	2,873
Linseed	–	–	59	3,870	639
Total	42,197	49,315	49,903	55,517	35,723

[1] Includes oil equivalent of seed and oil-bearing materials imported. [2] Nine months (July-March 1969).
[3] Mainly from the United States.

Source: Department of Primary Industry.

AUSTRALIA: Imports of Soybean Meal and Fishmeal

Fiscal year	Soybean meal	Fishmeal	Total
	Long tons	*Long tons*	*Long tons*
1963-64	6,803	9,335	16,138
1964-65	13,446	12,170	25,616
1965-66	26,024	12,684	28,708
1966-67	20,620	15,537	36,157
1967-68	33,502	30,893	64,395
1968-69[1]	19,550	30,164	49,717

[1] Eleven months only.

Source: Report Department of Primary Industry.

AUSTRALIA: Mixed Feed Production

Fiscal year	Poultry feed	Poultry feed, pelleted or crumbled	Other	Total
	Metric tons	*Percent*	*Metric tons*	*Metric tons*
1965-66	807,079	75.7	273,238	1,080,317
1966-67	845,497	79.1	278,448	1,123,945
1967-68	949,220	80.1	332,329	1,281,549
1968-69	951,678	79.2	279,023	1,230,701

Source: Commonwealth Bureau of Census and Statistics.

AUSTRALIA: Oilseed production[1]

Fiscal year	Cottonseed	Safflower	Sunflower	Peanuts	Soybeans	Rapeseed	Flaxseed
	Long tons	*Long tons*	*Long tons*	*Long tons*	*Long tons*	*Long tons*	*Long tons*
1964-65	15,000	12,453	1,963	3,155	1,094	–	46,600
1965-66	27,000	9,814	2,429	1,247	622	–	6,064
1966-67	24,000	24,451	3,650	3,634	741	5	13,744
1967-68	34,000	15,613	4,500	10,797	1,500	17	10,482
1968-69[2]	40,000	16,600	14,000	5,761	1,500	480	14,000
1969-70[2]	63,135	3,325	N.A.	[3] 10,000	N.A.	–	35,000

[1] Does not include 5 percent used for seed. [2] Preliminary. [3] For crushing.

Note: Olive oil production was 82 tons in 1964-65, 101 tons in 1965-66, 137 tons in 1966-67, and 125 tons in 1967-68.

Source: Department of Primary Industry.

NEW ZEALAND

With two and three-quarters million people, a developing poultry industry, and large livestock herds (mainly cattle and sheep), New Zealand could easily become a market for more soybean meal, potentially 25,000 to 35,000 tons from the United States. The country's economy is on an even keel, and imports and exports have reached record dollar levels.

Much like Australia, New Zealand has made many attempts to grow soybeans; however, it has had only minor success. The country could find a use for large quantities of imported soybean meal before a sizable domestic soybean production is developed. New Zealand at the present time could use imports of 10,000 to 15,000 tons of soybean meal for its broiler industry alone, in lieu of present imports of around 2,000 tons. Current imports come largely from Western Europe and are high in cost because the meal is bagged rather than bulk.

Production of poultry meat, which has been around 11,000 to 12,000 metric tons, is expected to increase rapidly in the future.

At present, most edible vegetable oils are imported, but research is being conducted to determine the possibility of growing edible oilseeds in addition to soybeans to produce vegetable oil. The volume of oils imported is not great, as domestically produced butter is a plentiful substitute.

Domestic oilseed production

Soybean production has not been too successful in New Zealand. Trials have been conducted on South Island at the Lincoln College Crops Research Station without much response. However, work being done on North Island indicates that some potential exists for growing soybeans there. However, only 2,000 to 3,000 acres are being planted at present. Yields are much better in the northeast area of North Island than in other areas. On South Island, where nights are colder, yields are very low. The yield would need doubling to make the crop economical.

Considerable research work has been done on rapeseed, and an aphid-resistant variety has been developed. Some potential for this crop has been found on South Island. Rapeseed continues to be studied for adaptation to all parts of the country. Birds are one of the main problems encountered with this crop. The winter rapeseed crop is harvested in the spring, some as forage because of low yields.

Sunflowerseed has been adapted to New Zealand conditions, but production is small and extensive trials are still going on. High yielding sunflowerseed varieties are grown in the Hawkes Bay area.

New Zealand's flaxseed crops have been very small, but this industrial crop has provided some of the linseed oil needed by industry and an excellent meal for dairy cattle feed.

The New Zealand trade predicts that the country will become self-sufficient in vegetable oils in 10 years, with the exception of coconut oil, for which copra will continue to be imported.

New Zealand has one oilseed crushing plant, Abels Limited, at Aukland. This plant crushes imported oil-bearing materials, including copra, and small quantities of domestic copra and oilseeds with expellers (screw presses). The plant also has a continuous refinery and hydrogenation facilities to produce shortening and confectionary fats.

Feed situation and imports

New Zealand has had about a 2-year supply of wheat on hand and intends to divert some of this for poultry and livestock feeds. It is realized, however, that in using this carbohydrate for feed, the ever-short supply of vegetable protein will have to be increased, particularly when feeding the wheat to poultry. There is an awareness that the most efficient protein to meet this need is soybean meal. Meat and bone meals are plentiful, but because of their high calcium content their use is limited.

New Zealand has a licensing and quota system that applies to imports of soybean meal, soybean oil, and other fats, oils, and oilseed products. As a result the opportunities to increase imports of soybean meal have been limited. In 1969 the import quota on oilseeds and products was set at 105 percent of 1968 issued licenses.

The Industries Division, Department of Industry and Commerce, sets the quotas and issues or denies import licenses. In the past, it has been reluctant to set high quotas to allow larger imports of feedstuffs of any type. However, it recently reported that the modern feed formulations being used and the high feed-conversion ratios they have made possible dictate the need for importing more soybean meal for the poultry and livestock industries. The Division's reluctance in the past to import soybean meal reportedly was based on lack of knowledge of the advantages of its use in feed. It is now aware of these advantages and has given serious consideration to opening up the import system for soybean meal.

The price of soybean meal, 49-percent protein, is about $140 per short ton, bagged, landed in New Zealand. Thus, whether larger quantities are imported will depend partly upon whether the soybean ration is worth this high cost to the broiler industry. Some technicians in New Zealand report that the use of soybean balanced rations with 18 to 25 percent protein could possibly reduce feed-conversion ratios from 2.7-2.5 to 1 to around 2.2-1.9 to 1 with the Australian breeds of broilers now being used. If the cost of soybean meal could be reduced about $20 to $25 per ton by importing bulk soybean meal in 5,000-to-10,000-ton cargo lots, soybean meal could possibly gain an improved position in New Zealand poultry rations.

New Zealand raises 6.5 million broilers, and experts expect this to go up to 9.2 million in 1972 and 15.5 million in 1980. Thus, the present possible market is for 10,000 to 25,000 tons of soybean meal for broilers. The market in 10 years could be for around 35,000 tons.

In 1968 a reported 4,806,000 pounds (2,403 short tons) of bagged soybean meal and flour (combined) were imported, mainly from the United Kingdom, Australia, and the United States. The United States supplied only 113,700 pounds (56.5 tons) in that year. Total soybean oil imports in 1968 were 340,113 gallons or about 3,618,870 pounds, valued at $388,668. Of this, the United States supplied only 11,856 gallons (91,291 lb.); the balance came from the Netherlands, Denmark, and West Germany. About 170,000 gallons of peanut oil, 71,000 of rapeseed oil, and 32,000 of sunflowerseed oil also were imported.

U S DEPARTMENT OF AGRICULTURE
WASHINGTON, D. C. 20250

OFFICIAL BUSINESS

Penalty for Private Use $300

PLEASE NOTE: To make a change or correction we need the mailing label returned.

If you no longer need this publication, check here ____ and return this sheet and/or envelope in which it was mailed and your name will be dropped from mailing list.

If your address should be changed ____ PRINT or TYPE the new address, including ZIP CODE and return the whole sheet and/or envelope to:
Foreign Agricultural Service, Rm 5918 So.
U.S. Department of Agriculture
Washington, D. C. 20250

United States Department of Agriculture
POSTAGE & FEES PAID

M-227

9708 UAEUR&600A122 10003 0001
USDA ARS EAST UTIL RES & DEV
DIV LIB
600 E MERMAID LA
PHILADELPHIA PA 19118